

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

### **COMPLETE LISTING OF CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

#### **Listing of Claims:**

1. (original) A process for manufacturing a coloured polyethylene terephthalate container or container preform comprising providing a moulded polyethylene terephthalate container or container preform, providing a colouration zone containing as a solution or dispersion in a liquid medium one or more colourants having a chemical affinity for polyethylene terephthalate, and in the colouration zone contacting the container or container preform with the one or more colourants in the liquid medium for a period of time and under conditions effective to cause at least a portion of the one or more colourants to migrate from the liquid medium and bind to the polyethylene terephthalate of the container or container preform.
- 2.. (original) A process according to claim 1 which comprises providing a polyethylene terephthalate moulding composition and subjecting said polyethylene terephthalate moulding composition to a moulding step thereby to form the container or container preform.
3. (previously presented) A process according to claim 1 wherein the one or more

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

colourants comprises a disperse dye.

4. (original) A process for manufacturing a polyethylene terephthalate container or container preform having additive-imparted functionality comprising providing a moulded polyethylene terephthalate article, providing an additive impartation zone containing as a solution or dispersion in a liquid medium one or more additives having a chemical affinity for polyethylene terephthalate, and in the additive impartation zone contacting the container or container preform with the one or more additives in the liquid medium for a period of time and under conditions effective to cause at least a portion of the one or more additives to migrate from the liquid medium and bind to the container or container preform.

5. (original) A process according to claim 4 wherein the one or more additives is selected from the group comprising UV filters, oxygen absorbers, antimicrobial agents, antioxidants, light stabilizers, optical brighteners, processing stabilizers, flame retardants and mixtures of two or more thereof.

6. (previously presented) A process according to claim 1 wherein the effective conditions comprise a temperature of at least about 40 ° C.

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

7. (original) A process according to claim 6 wherein the effective conditions comprise a temperature of at least about 60 ° C.

8. (currently amended) A process according to ~~any one of claims 1 to 6~~ wherein the container or container preform is a bottle or bottle preform.

9. (original) A method of making a blow moulded bottle from a polyethylene terephthalate moulding composition which comprises:

- i. providing a polyethylene terephthalate moulding composition;
- ii. heating the polyethylene terephthalate moulding composition;
- iii. extruding the hot polyethylene terephthalate moulding composition so as to form a bottle preform;
- iv. contacting the bottle preform with a colourant having a chemical affinity for polyethylene terephthalate for a period of time and under conditions effective to cause binding of the colourant to the polyethylene terephthalate; and
- v. blow moulding the bottle preform at a blow moulding temperature so as to form a coloured bottle.

10. (original) A method of making a blow moulded bottle from a polyethylene terephthalate moulding composition which comprises:

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

- a. providing a polyethylene terephthalate moulding composition;
- b. heating the polyethylene terephthalate moulding composition;
- c. extruding the hot polyethylene terephthalate moulding composition so as to form a bottle preform;
- d. blow moulding the bottle perform at a blow moulding temperature so as to form a bottle;
- e. contacting the bottle with a colourant having chemical affinity for polyethylene terephthalate for a period of time and under conditions effective to cause binding of the colourant with the polyethylene terephthalate.

11. (original) A method of making a blow moulded bottle from a polyethylene terephthalate moulding composition which comprises:

- I. providing a polyethylene terephthalate moulding composition;
  - II. heating the polyethylene terephthalate moulding composition;
  - III. extruding the hot polyethylene terephthalate moulding composition so as to form a bottle preform;
  - IV. contacting the bottle preform with an additive having a chemical affinity for polyethylene terephthalate for a period of time and under conditions effective to cause binding of the additive colourant to the polyethylene terephthalate;
- and

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

V. blow moulding the bottle preform at a blow moulding temperature so as to form a bottle with a desirable functionality attributable to the bound additive.

12. (original) A method of making a blow moulded bottle from a polyethylene terephthalate moulding composition which comprises:

- A. providing a polyethylene terephthalate moulding composition;
- B. heating the polyethylene terephthalate moulding composition;
- C. extruding the hot polyethylene terephthalate moulding composition so as to form a bottle perform;
- D. blow moulding the bottle preform at a blow moulding temperature so as to form a bottle;
- E. contacting the bottle with an additive having chemical affinity for polyethylene terephthalate for a period of time and under conditions effective to cause binding of the additive with the polyethylene terephthalate.

13. (previously presented) A process according to claim 1 wherein the colourant or additive is targetted to a specific region of the container or container preform by regioselective contacting of the container or container preform with the colourant or additive.

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

14. (previously presented) A process according to claim 1 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the duration of contact of the container or container preform with the colourant or additive.
15. (previously presented) A process according to claim 1 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the concentration of colourant or additive in the solution/dispersion.
16. (previously presented) A process according to claim 1 wherein the container or container preform requires no chemical pre-treatment prior to contacting the colourant or additive in order to provided effective binding therebetween.
17. (previously presented) A process according to claim 1 wherein a first contact between the container or container preform and a colourant or additive is followed by a drying step and then a further contact between the container or container preform and different colourant or additive.
18. (previously presented) An article produced by a process according to any one of claim 1.

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

19. (original) A moulded polyethylene terephthalate article according to claim 18 having an inside surface and an outside surface and a colourant or additive having a chemical affinity to polyethylene terephthalate bound predominantly to one, but not the other, of said surfaces.

20. (previously presented) A container or container preform according to claim 18 wherein the colourant or additive is bound below the surface of the container or container preform as a result of migration from a surface point of contact into the material of the polyethylene terephthalate container or container preform.

21. (previously presented) A process according to claim 4 wherein the colourant or additive is targetted to a specific region of the container or container preform by regioselective contacting of the container or container preform with the colourant or additive.

22. (previously presented) A process according to claim 9 wherein the colourant or additive is targetted to a specific region of the container or container preform by regioselective contacting of the container or container preform with the colourant or additive.

23. (previously presented) A process according to claim 10 wherein the colourant

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

or additive is targetted to a specific region of the container or container preform by regioselective contacting of the container or container preform with the colourant or additive.

24. (previously presented) A process according to claim 11 wherein the colourant or additive is targetted to a specific region of the container or container preform by regioselective contacting of the container or container preform with the colourant or additive.

25. (previously presented) A process according to claim 12 wherein the colourant or additive is targetted to a specific region of the container or container preform by regioselective contacting of the container or container preform with the colourant or additive.

26. (previously presented) A process according to claim 4 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the duration of contact of the container or container preform with the colourant or additive.

27. (previously presented) A process according to claim 9 wherein the amount of colourant or additive bound to the container or container preform can be controlled



Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

by controlling the duration of contact of the container or container preform with the colourant or additive.

28. (previously presented) A process according to claim 10 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the duration of contact of the container or container preform with the colourant or additive.

29. (previously presented) A process according to claim 11 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the duration of contact of the container or container preform with the colourant or additive.

30. (previously presented) A process according to claim 12 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the duration of contact of the container or container preform with the colourant or additive.

31. (previously presented) A process according to claim 4 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the concentration of colourant or additive in the solution/dispersion.

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

32. (previously presented) A process according to claim 9 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the concentration of colourant or additive in the solution/dispersion.

33. (previously presented) A process according to claim 10 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the concentration of colourant or additive in the solution/dispersion.

34. (previously presented) A process according to claim 11 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the concentration of colourant or additive in the solution/dispersion.

35. (previously presented) A process according to claim 12 wherein the amount of colourant or additive bound to the container or container preform can be controlled by controlling the concentration of colourant or additive in the solution/dispersion.

36. (previously presented) A process according to claim 4 wherein the container or container preform requires no chemical pre-treatment prior to contacting the colourant or additive in order to provided effective binding therebetween.

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

37. (previously presented) A process according to claim 9 wherein the container or container preform requires no chemical pre-treatment prior to contacting the colourant or additive in order to provided effective binding therebetween.

38. (previously presented) A process according to claim 10 wherein the container or container preform requires no chemical pre-treatment prior to contacting the colourant or additive in order to provided effective binding therebetween.

39. (previously presented) A process according to claim 11 wherein the container or container preform requires no chemical pre-treatment prior to contacting the colourant or additive in order to provided effective binding therebetween.

40. (previously presented) A process according to claim 12 wherein the container or container preform requires no chemical pre-treatment prior to contacting the colourant or additive in order to provided effective binding therebetween.

41. (previously presented) A process according to claim 4 wherein a first contact between the container or container preform and a colourant or additive is followed by a drying step and then a further contact between the container or container preform and different colourant or additive.

Applicant: Fuquan Zeng  
Serial No.: 10/630,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

42. (previously presented) A process according to claim 9 wherein a first contact between the container or container preform and a colourant or additive is followed by a drying step and then a further contact between the container or container preform and different colourant or additive.

43. (previously presented) A process according to claim 10 wherein a first contact between the container or container preform and a colourant or additive is followed by a drying step and then a further contact between the container or container preform and different colourant or additive.

44. (previously presented) A process according to claim 11 wherein a first contact between the container or container preform and a colourant or additive is followed by a drying step and then a further contact between the container or container preform and different colourant or additive.

45. (previously presented) A process according to claim 12 wherein a first contact between the container or container preform and a colourant or additive is followed by a drying step and then a further contact between the container or container preform and different colourant or additive.

46. (previously presented) An article produced by a process according to claim 4.

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

47. (previously presented) A moulded polyethylene terephthalate article according to claim 46 having an inside surface and an outside surface and a colourant or additive having a chemical affinity to polyethylene terephthalate bound predominantly to one, but not the other, of said surfaces.

48. (previously presented) An article produced by a process according to claim 9.

49. (previously presented) A moulded polyethylene terephthalate article according to claim 48 having an inside surface and an outside surface and a colourant or additive having a chemical affinity to polyethylene terephthalate bound predominantly to one, but not the other, of said surfaces.

50. (previously presented) An article produced by a process according to claim 10.

51. (previously presented) A moulded polyethylene terephthalate article according to claim 50 having an inside surface and an outside surface and a colourant or additive having a chemical affinity to polyethylene terephthalate bound predominantly to one, but not the other, of said surfaces.

52. (previously presented) An article produced by a process according to claim 11.

Applicant: Fuquan Zeng  
Serial No.: 10/530,984  
Int'l Application No.: PCT/GB2003/004387  
Int'l Filing Date: October 10, 2003  
For: Moulded Thermoplastic Articles And Process To Make Them  
Attorney's Docket No.: N2242-WPT-EAS (N2459)  
Customer No.: 23456

53. (previously presented) A moulded polyethylene terephthalate article according to claim 52 having an inside surface and an outside surface and a colourant or additive having a chemical affinity to polyethylene terephthalate bound predominantly to one, but not the other, of said surfaces.

54. (previously presented) An article produced by a process according to claim 12.

55. (previously presented) A moulded polyethylene terephthalate article according to claim 54 having an inside surface and an outside surface and a colourant or additive having a chemical affinity to polyethylene terephthalate bound predominantly to one, but not the other, of said surfaces.

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☒ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**